

File: WAPANOCCA NWR  
4/00

## Biological Review of Wapanocca and Big Lake NWR's - 3/23/99

### Summary Recommendations

#### A. Wapanocca NWR

##### 1. Wapanocca Lake

- a. Drain lake for minimum of 2 consecutive summers
- b. Explore with COE the possibility of diverting Mississippi waters through lake to flush nutrients.

##### 2. Cropland

- a. Reforestation - no further reforestation
- b. Crop Production
  - i. Continue present crop management plans
  - ii. Purchase irrigation equipment for corn production

##### 3. Recreational Fishing

- a. Improve by completing A.1 a&b.
- b. Extend season from present 3/15-9/30 to 3/15-10/31.

##### 4. Recreational Hunting

- a. Squirrel/rabbit - Extend season from 10/1-11/15 to 10/1-11/30.
- b. Raccoon
  - i. Continue March hunt
  - ii. Extend fall season from 11/1-15 to 11/1-30
- c. Deer - Provide archery hunt when refuge receives additional staffing
- d. Nuisance Animals - Allow hunters to take beaver, nutria and wild hogs incidental to other refuge hunt programs

##### 5. Wood Duck Program

- a. Continue present level of box maintenance
- b. Continue present level of wood duck banding

##### 6. Waterfowl use - Keep objective levels as currently set

- a. Canada geese - 1,200,000 use days annually

B. Big Lake NWR

1. Water Management

- a. Explore the possibility of revising the MOU with COE to further increase the diversion of flood waters
- b. Rehab moist soil unit dike to enable positive management
- c. Manage for summer drawdowns when possible.

2. Cropland Management - Continue to manage present cropland for deer and Canada goose browse.

## **Biological Review of Wapanocca and Big Lake NWR's - 3/23/99**

In attendance - Don Orr, WHM, Memphis; Tom Edwards WHM, Hazen; John Forester and Cedric Doolittle, Baton Rouge Fisheries Resource Office; Randy Cook, Reelfoot NWR; Dennis Widner, Cache River NWR; Glen Miller Wapanocca/Big Lake NWRs.

### Wapanocca NWR

Wapanocca National Wildlife Refuge, established January 24, 1961, is located approximately 20 miles northwest of Memphis, Tennessee, in Crittenden County, Arkansas. The lands were acquired under the Migratory Bird Conservation Act (16 U.S.C. 715-715r), as amended, for use as an inviolate sanctuary, or for any other management purpose, for migratory birds (16 U.S.C. 715d). The refuge began its existence when 3,119 acres were leased from the Wapanocca Outing Club. As funds were made available from the sale of duck stamps, this land and various other tracts were purchased. On January 1, 1966, a substantial amount of land (1,695 acres) was added to the refuge and today Wapanocca totals 5,484.17 acres.

#### **I. Wapanocca Lake**

Wapanocca Lake is an old oxbow of the Mississippi River. The periodic flooding from the Mississippi River would have had the effect of flushing the lake. After the Mississippi River levee was constructed, Big Creek became the avenue for flushing the lake. Big Creek flows along the north boundary of the refuge. Many people in the area remember when Big Creek had normal summer depths of 4 feet and was so clear they could see the stream bottom. It had a tremendous fisheries. Prior to refuge establishment, a small levee was constructed along the south side of Big Creek and a wooden structure installed to somewhat control water levels in the lake. Almost yearly Big Creek flooded and water entered the lake over the levee. As additional lands were drained and cleared for farming upstream, Big Creek began to carry an increasing silt load which began to fill in the lake, greatly decreasing its productivity. However, as water backed into the lake, it mixed with existing lake waters and when creek levels subsided, waters from the lake flowed back into the creek resulting in flushing the nutrient load.. A concrete stoplog water control structure was constructed in 1964. The creek waters continued to spill over and through the sub-standard levee system and into the lake playing havoc with water quality, water level management and fish management objectives. In 1980, the existing levee system was raised to present heights. This allowed the control of water entering the lake from Big Creek. Big Creek itself has had channelization and clean out downstream which has effected water management of the lake. The Fishery Management Plan called for using waters from Big Creek to flush the lake during winter months. Due to the work done on the creek downstream, water levels no longer reach the desired levels to back flow into the lake and flush the lake. As a result the lake has become overloaded with nutrients creating a fisheries problem. The lake bottom contains 4-5 feet of muck which is detrimental to fish spawning and the production of rooted aquatics which would benefit waterfowl. It is recommended that the

lake be drawn down for 2 consecutive summers in order to solidify the lake bottom. The channel from Big Lake to Little Lake and Little Lake to the water control structure will need to be cleaned out in order to adequately drain the lake.

The problem of needed periodic flushing should be explored with the U.S. Army Corps of Engineers. Flushing could be achieved with construction of a structure through or over the Mississippi River levee with back waters from the Mississippi River diverted through a pipeline, down Drainage District Ditch #8 or down Wapanocca Bayou. The project would probably qualify for funding by the COE under Section 1135.

Recovery of the lake would benefit fisheries and waterfowl. In the 1970's fishing visits averaged 47,000 visits per year with a high of 74,000 visits in 1978 (See Appendix I). There was an excellent population of bass, crappie, catfish and especially bream. The lake was drawn down in 1967 and 1968 which allowed for some solidification of the bottom providing firm spawning sites. Subsequent drawdowns did not achieve desired results probably due to inability to dry out the mud.

The 1986 refuge objective for fishing was established at 100,000 activity hours or 20,000 visits (See Appendix II). That was based on numbers occurring at that time and not the demand and potential as seen in the 1970's. The National Wildlife Refuge System Improvement Act of 1997 identifies recreational fishing as a priority public use and the mission of the System.. "restoration of the fish resources and their habitats within the United States for the benefit of present and future generations of Americans." A revised objective of 70,000 visits is not out of line for this lake. This is the only lake in this area open to public fishing thus there is a big demand for quality fishing.

Improved water quality and lake bed conditions would also allow Potamogeton and Sago to become established in the lake, creating another duck food source. Food production on the refuge is inadequate at present to meet food requirements of the 3,700,000 duck use day objective. Lake foods would help to meet the need. (Appendix III).

Historically Wapanocca Lake was a wintering site for the trumpeter swan. As this swan increases in population and distribution Wapanocca Lake will once again become important for a wintering site. Improvement to the lake would allow the swans to be attracted to the refuge and provide food requirements.

## II. Cropland

### A. Reforestation

Reforestation on the refuge has been accomplished in small fields to reduce forest fragmentation and retire marginal, highly erodible cropland. Through reforestation of 350 acres, this process has virtually been completed. With the relatively small size of the refuge (5,484) acres and little likelihood of expanding the boundary to 10,000 acres, the refuge has not been listed by the Mississippi Alluvial Valley Migratory Bird Initiative as an area to meet forest breeding bird goals.

### B. Crop Production

One of the original primary objectives of the refuge was to provide a link in the chain of refuges along the Mississippi River to encourage the southward migration of Canada geese to the Gulf of Mexico. Although providing the habitat requirements, this objective was not reached. During recent mild winters, the Canada geese have had most of their requirements met in southern Illinois and elsewhere. The fact that Wapanocca still winters dome Canada geese every year may be the result of the chain of refuges that was created. Without this chain and the refuge, there might not be any geese wintering on Wapanocca. The Arkansas Mississippi Alluvial Valley Joint Ventures objectives set in 1996 put the total of 556,110 use days for public lands within the state of Arkansas. Foraging habitat objectives were 52 acres green forage, 60 acres unharvested crops and 221 acres of harvested cropland. These figures were based on existing populations within the state during relatively mild winters.

The review team believes that the 1986 objective figure of 1,200,000 Canada goose use days is still a valid objective. During severe winters in the 1980's this figure was exceeded several times as birds were forced to leave Illinois (Appendix IV). It is for these unpredictable years that hot foods such as corn needs to be available. The Mississippi Valley Population Plan calls for maintaining present management plans for this population of Canada Geese. Neck Collar observations indicate the majority of geese using this refuge is of that population.

Corn production is greatly reduced during excessively hot and dry summers such as during 1998. There were additional problems with corn production in that year associated with aflatoxin. This is a toxin formed from fungus when corn in the kernel forming stage undergoes severe stress due to heat and dry conditions. There is little research as to what effects this toxin has on wildlife but some of the research suggests levels of 300 parts per billion (PPB) may have detrimental effects. Corn on the refuge tested 2900 PPB in one field and 5400 PPB in two fields. In order to prevent this it is recommended that wells be dug and pivot irrigation systems installed. Placed at strategic locations these wells could also be utilized to provide positive water management for most of the 200 acres of impoundments.

In order for habitat to be attractive to populations of over 1,000-1,500 Canada geese, at least 1,200 to 1,500 acres of open habitat is desirable. Any further retirement of marginal cropland should come in the form of grasslands and not reforestation. Drainage ditches cutting through the cropland should be kept free of tree growth in order not to break up the effect of open space.

There has not been a problem of snow goose buildup on Wapanocca Refuge, thus there is no apparent need to change cropland plans for snow goose management.

### III. Recreational Fishing

The need to improve recreational fishing was detailed in Section I of this report. In addition the recommendation was made to extend the current fishing season from the current 3/15 - 9/30 time frame to 3/15 - 10/31. There would be minimal disturbance to migrating waterfowl as the early migrants such as blue-winged teal do not use the open waters of the lake. No appreciable numbers of waterfowl use the lake until mid-November. In addition crappie fishing is normally good during the fall and the demand is relatively high.

### IV. Recreational Hunting - Not currently meeting the 1986 Objective Level.

#### A. Squirrel/rabbit

The current season runs from October 1 - November 15. Rabbit hunting is a popular sport in this area but not on the refuge. While the refuge supports a large population of cottontails and some swamp rabbits the November 15 cutoff is too early for hunters. They prefer hunting after the first freeze which local hunters claims kills the "wool" worm. This is actually a bot fly, the larvae of which are in the area between the skin and the muscle. Consumption of the meat is not affected by the larve, but hunters are not convinced of this. A November 30 hunt ending would allow more hunters to pursue this sport. Squirrel hunting would be extended in conjunction.

The hunting would have minimal effect on waterfowl use as most hunting would occur far from waterfowl use areas.

#### B. Raccoon

The raccoon population on the refuge is large and is one factor severely limiting ground nesting and low shrub nesting wildlife. The season currently runs November 1-15 and March 1-31. During the November time frame, hunters miss numerous animals due to leaves on the trees, and they refuse to take some animals that are young and small. The recommendation is to extend the November hunt through November 30, the same cutoff point as squirrel and rabbit hunting. The March hunts would be continued.

### C. Deer

There is no noticeable overpopulation of deer on the refuge, however deer are frequently seen. Deer that travel between the refuge and the river levee are often harvested in the vicinity of the refuge. The relatively small size of huntable acres dictates that any hunt would be a quota hunt. The refuge could accommodate a quota bow hunt but is not recommended at this time due to insufficient staffing to conduct a viable program.

### D. Nuisance Animals

Beaver continually impede water management. Nutria have recently invaded the refuge and are already noticeably affecting the young cypress stands. Wild hogs are now residing in the area around the Mississippi River levee and will only be a matter of time before they invade the refuge if they haven't already. These animals should be targeted for control measures by trapping and/or hunting. It is recommended that they be allowed to be taken by hunters incidental to other refuge hunt programs.

## V. Moist Soil Plant Production

Continue to manage impoundments for moist soil plant production when the opportunities are there.

Proposed irrigation systems mentioned in part II B could be used to increase productivity of the units.

## VI. Wood Duck Program

### A. Box Program

The primary objectives of the refuge master plan of 1965 included providing "a nesting and brooding area for resident wood duck populations." The management objective of 2,500 young produced was established in 1986. It is unknown how many young are produced from natural cavities but is not believed to be anywhere close to the objective figure. Considering 10 percent of the natural cavities are suitable for wood duck nesting, average 10 hatch per successful nest and 50 percent duckling mortality it would take a minimum of 10,000 natural cavities. Brood habitat is available to produce the objective number.

The refuge currently has 300 wood duck boxes being maintained including 50 from a study being conducted by a Louisiana State University graduate student. The number of boxes is limited by habitat size and availability for maintenance. The 300 boxes is believed to be the maximum this refuge can reasonably support without going to compartmentalizing and clustering of boxes. The regional policy is to avoid these activities.

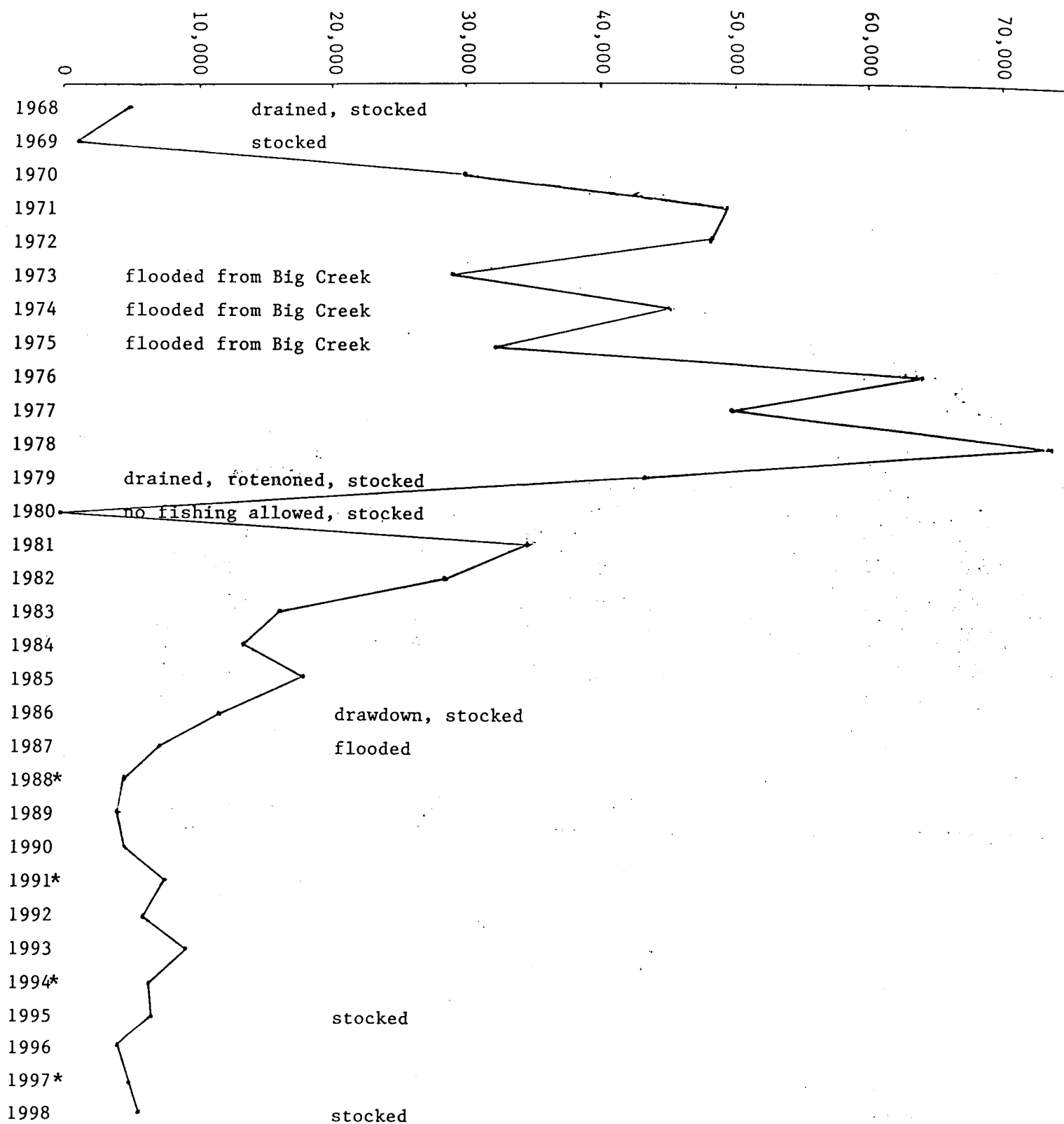
## B. Banding

The refuge should continue efforts to meet and exceed the banding goal of 188 wood ducks set for the refuge.

## VII. Duck Use

The objective level for ducks using the refuge should be kept at 3,700,000 use days (Appendix V). Food resources on the refuge for that figure is not currently being met (Appendix III). The proposed lake improvement (Section I), irrigation wells (Section II), and summer drawdowns of the lake promoting the growth of natural waterfowl foods is expected to greatly reduce the deficit.

## Fishing visits



\* Years waters in lake held high into late May or early June to enhance spawning

## REFUGE OBJECTIVES

Wapanocca National Wildlife Refuge  
(5,484 acres)

<u>REFUGE OBJECTIVES</u>	<u>UNIT</u>	<u>OUTPUTS</u>
Wildlife Interpretation	AH	28,000
Environmental Education	AH	3,000
Hunting	AH	4,000
Fishing	AH	100,000
Wildlife Observation	AH	20,000
Threatened Species Maintenance	UD	500
Waterfowl Maintenance	UD	4,900,000
Geese		(1,200,000)
Ducks		(3,700,000)
Waterfowl Production	EA	2,500

MISSION STATEMENT:

Manage Wapanocca Lake, associated bottomland hardwoods, and cleared agricultural lands to provide needed food and habitat for wintering migratory waterfowl.

REQUIRED MANAGEMENT PROGRAMS:

Co-op farming program for waterfowl foods, moist soil management in shallow impoundments, waterfowl banding, goose collar observation, visitor center operation, environmental education, wildlife observation drive, small game and raccoon hunts, seasonal sport fishing during March 15 to September 30, boat and fishing concession, and commercial fishing.

Approved By:

John C. Oberhen  
Refuge Manager

6-6-86  
Date

Harold W. Benson  
Refuge Supervisor

6/16/86  
Date

Harold W. Benson  
Assistant Regional Director  
Wildlife Resources

6/16/86  
Date

**Calculation of food (seeds and browse) requirements for meeting  
Wapanocca NWR Waterfowl Objectives**

<b>Seed</b>	<b>Ducks</b>	<b>Geese</b>	<b>Total</b>
objective (use days)	3,700,000	1,200,000	4,900,000
x lbs. seed used per day*	0.25	0.50	
x % of days seeds are used	1.00	0.50	
= lbs. of seed needed	925,000	300,000	1,225,000
- lbs. moist soil seed (200 ac. x 356 lbs./ac.)	71,200	0	71,200
= lbs. of planted crop seeds needed	853,800	300,000	1,153,800
- lbs./ac. available from unharvested planted crops	3,000	3,000	3,000
= ac. of unharvested crops needed	285	100	385

**Browse**

objective (use days)	1,200,000
x lbs. browse used per day	1.00
x % of days browse is used	0.50
= lbs. of browse needed	600,000
- lbs. of browse per acre	2,000
= ac. if browse needed	300

\*assuming ducks metabolize 2.5 kilocalories of energy/gram of seeds (Reinecke et al. 1989)

Peak #

Mild fall, cold early January  
Mild winter

Mild winter

Cold period in January

Cold period in December

WILD WHITE  
Mild fall.

Mild winter

Mild winter

Mild winter

December extremely cold

January warmest on record  
Cold and snowy January

Extremely mild winter

Below normal temperatures

Cold January and February

Cold winter

Mildest winter since refuge started

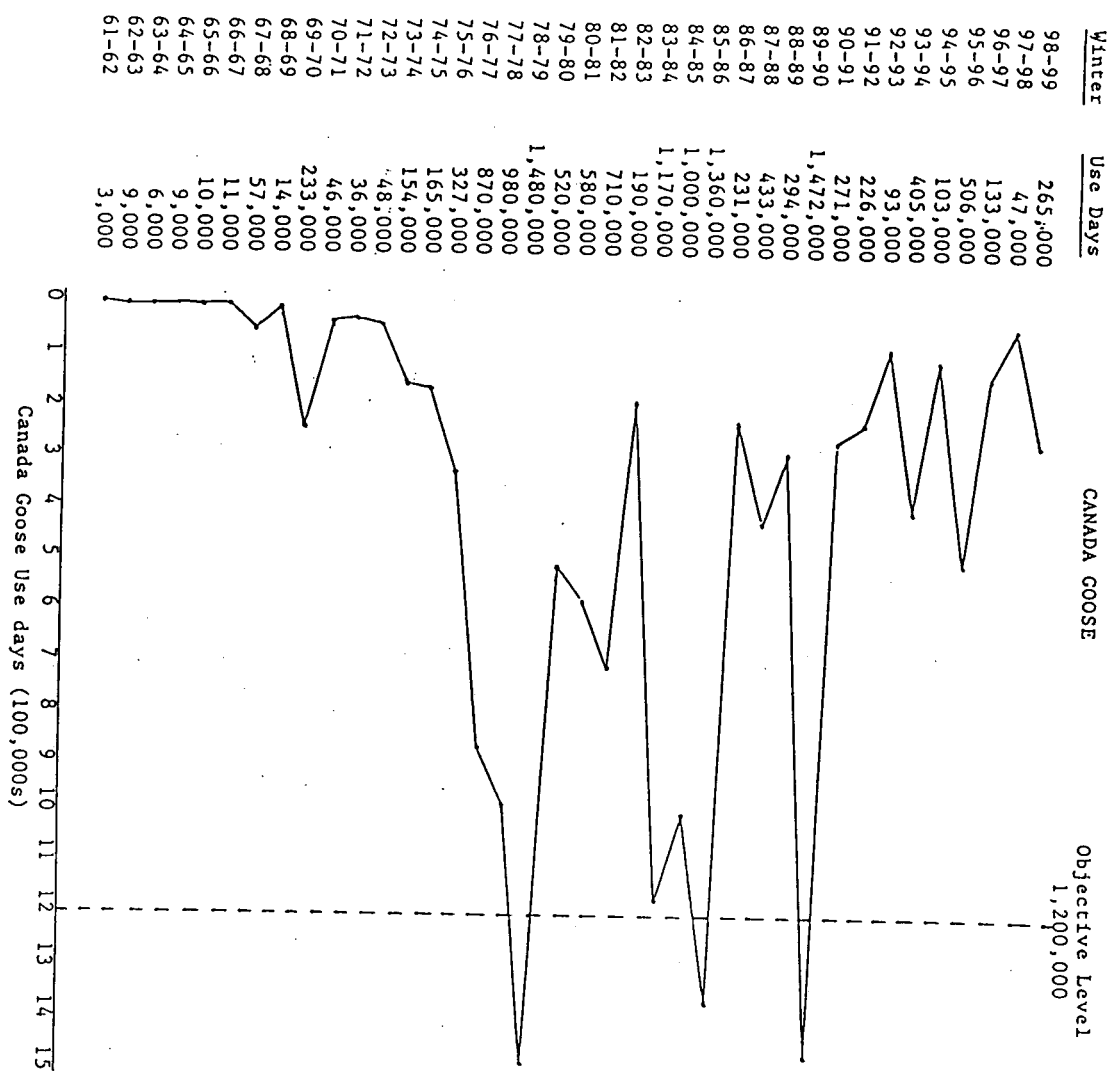
Cold January  
Mild winter

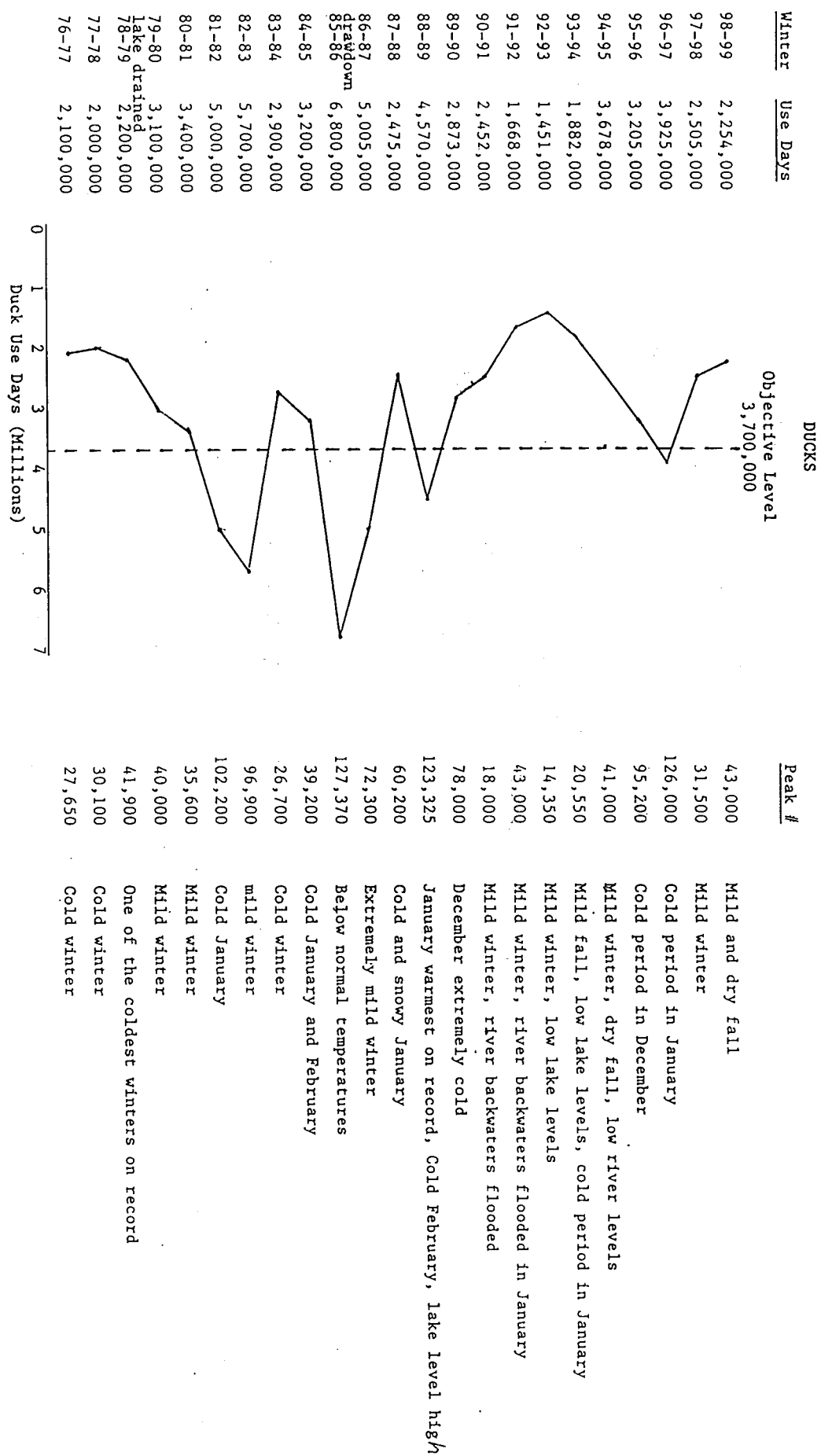
mild winter  
 mild winter

One of the coldest winters on record

Cold winter

Cold winter





## Big Lake NWR

### Purposes

"...as a refuge, reserve and breeding ground for native birds." Executive Order 2230, dated August 2, 1915. "...for use as an inviolate sanctuary, or for any other purpose, for migratory birds." 16 U.S.C. 715d (Migratory Bird Conservation Act).

### Description

Big Lake Refuge, located in Northern Arkansas at the northern end of Mississippi County, is approximately 10.5 miles long and 2.5 miles wide, and 11,038 acres in size. Big Lake bottoms are the only remnants of habitat remaining in Mississippi County and takes on the characteristics of an oasis of timber and swamp in agricultural developed surroundings.

Big Lake's life flow, the right hand chute of Little River, is thought to have been a result of the Mississippi River course change. The great river's evolution deposited a large sediment area just south of what today is known as the Big Lake bottoms. This action along with effects of the New Madrid earthquake of 1811-12 were the chief architectural forces of Big Lake characteristics today. Once man arrived and started developing the surrounding areas, the ecosystem of the swamp began to change. The changes were slow at first but as technology improved more rapid changes occurred until the habitat within the swamp was transferred from what was once known as a hunter/fisherman paradise to a less attractive area.

An extensive network of ditches, in the Missouri Bootheel drains approximately 2,000 square miles of farmland directly through the refuge. During flood periods the inflows are heavily silt laden. Sediment fall out has continually filled the bottomland and swamp until there now exists a very shallow lake with an average depth of three feet. Continued siltation restricted any aquatic production at all, plus hampered timber growth and development. The refuge has been used primarily as a sump.

### I. Water Management

#### A. Flood Storage

The U.S. Fish and Wildlife Service has allowed the refuge to be used as a sump for flood waters. Positive management of the water is difficult due to high rainfall events throughout the year in the Bootheel of Missouri that push flood waters onto the refuge. There is a need for the Regional Director to revisit the Memorandum of Understanding with the U.S. Army Corps of Engineers and not allow Big Lake to be used for flood storage except for extreme flood events.

## B. Moist Soil Plant Production

1. Moist Soil Unit. Plans are underway to rehab the dikes to raise them back to the original height. This will prevent the smaller rises in the lake from flooding back over the dikes during dewatering and drying of the 200 acre unit.
2. Summer drawdowns should be considered which would expose some additional mudflats for moist soil plant growth. The drawdowns would benefit both fisheries and waterfowl.

## II. Cropland Management

Crop production in the mid and northern fields was virtually non-existent yearly due to prolonged spring flooding and subsequent weed problems. To better manage these fields they have been reforested. When in winter wheat, the Baker Island field is heavily utilized deer and Canada geese. This field should continue to be farmed for goose browse.

# REFUGE OBJECTIVES

Big Lake National Wildlife Refuge  
(11,036 acres)

<u>REFUGE OBJECTIVES</u>	<u>UNIT</u>	<u>OUTPUTS</u>
Wildlife Interpretation	AH	2,000
Environmental Education	AH	1,000
Hunting	AH	9,000
Fishing	AH	200,000
Wildlife Observation	AH	20,000
Threatened Species Maintenance	UD	800
Waterfowl Maintenance	UD	4,050,000
Geese		( 150,000)
Ducks		(3,900,000)
Waterfowl Production	EA	3,500

## MISSION STATEMENT:

Manage Big Lake NWR and its tributary drainages to maintain and enhance associated wetland habitats for the benefit of migratory birds, primarily waterfowl.

## REQUIRED MANAGEMENT PROGRAMS:

Operate and maintain six major water control structures in accordance with multiagency agreement, water level management of Big Lake, moist soil management on 190 acres, force account farming for waterfowl foods on 160 acres, waterfowl banding, goose collar observation, big game/small game/raccoon hunts, both year-round and seasonal sport fishing, commercial fishing, dike maintenance, driftwood jam prevention and removal.

Approved By:

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Refuge Manager

9/25/87  
Date

John C. Oberheuer  
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9-25-87  
Date

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9-28-87  
Date